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ABSTRACT

This paper describes general educational facility improvement planing principles and how factors peculiar to Massachusetts affect the planning process, including a description of the roles of the owner, architect, and other building professionals. Chapters examine the first steps in school planning, the role of the architect in preliminary planning, the school building assistance program, time requirements of the design process, Massachusetts law and how it affects design and construction, the successful completion of school construction, and the owner's representation and project management. (GR)

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Building, Expanding and Renovating Public Schools in Massachusetts

A Brief Owner's Guide to the Process

prepared by David Finney/AIA
for the Educational Facilities Committee
of the Boston Society of Architects/AIA

May 1999

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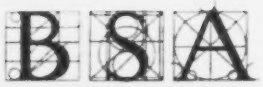

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Building, Expanding and Renovating Public Schools in Massachusetts

Contents

Introduction to the Process 2

First Steps in School Planning 3

The Role of the Architect in Preliminary Planning 4

The School Building Assistance Program 5

Time Requirements of the Design Process 7

Massachusetts Law—how it affects design and construction 9

Construction—how to complete it successfully 10

Owner's Representation and Project Management 12

Conclusion 15

References 16

Acknowledgements 17

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Introduction to the Process

In all probability, you are reading this because you are involved in planning for the renovation, expansion or new construction of a public school in Massachusetts. This guide is intended to give you some basic information on how to carry out that effort successfully.

There are several principles that apply to school planning in any situation, and there are also factors affecting the process that are peculiar to Massachusetts. Among these factors are the state statutes (primarily MGL Chapter 149 and subsequent laws), which govern the design and construction of public buildings in Massachusetts and the requirements of the state funding program for public schools, commonly known as School Building Assistance (SBA), based on the School Building Assistance Act (MGL Ch. 645, Acts of 1948), which provides the authorization for school-construction funding assistance.

The purpose of this brochure is to describe how general planning principles and these factors peculiar to Massachusetts affect the planning process and to describe the roles of the owner, the architect and other building professionals in the process.

If you are proceeding with a project that may involve SBA funding, you would be well-advised to obtain and read current copies of the Regulations Governing the School Building Assistance Act and the School Building Assistance Capital Grant Application. The application package contains a checklist that is a useful, detailed guide to the grant application process. These documents are updated yearly and are available from the Massachusetts Department of Education School Building Assistance Services.

First Steps in School Planning

What drives the typical school project at the most fundamental level is the need to augment, expand or improve a community's school facilities. The needs that drive a community to start planning a school project may appear in a variety of ways. It may be that enrollment growth is about to exceed (or has already exceeded) the capacities of a single school or the entire school system. It may be that one or more schools has become seriously inadequate to meet the needs of the educational program as that program has changed. The community's school buildings may also be in serious need of renovation due to age, heavy use, or damage due to fire or the elements.

Frequently, the need that drives a school project is a combination of some or all of these. An important part of the initial planning process is carefully to determine what the needs are that you are trying to address and then define a specific school building project (or projects) that satisfies those needs.

This process of defining the project(s) requires that the community define a number of specific components of the need. Does the need exist at all grade levels or is it confined to a specific level, such as the elementary or high school grades? Is the need confined to a single school or will it affect multiple schools (existing or new) at the target grade level? What are the enrollments that the project(s) must accommodate, now and in the future? What are the educational program needs that the project(s) must address? What are the physical limitations that must be addressed when using an existing building and what parameters will guide the choice between re-using an existing building and building new? What are the likely cost and schedule impacts of the options available? How will students and teachers be accommodated during the construction period?

Site-related questions are also of major importance, particularly since the sites available for new construction are frequently poor. Early identification of basic site parameters is therefore important. What are the site requirements for new construction or additions and what are the parameters that will guide the decision on available siting options?

Answering these questions usually requires the formation of a study com-

mittee to do an assessment that defines these project parameters. This assessment may be a feasibility study of a single building or it may start as a system-wide masterplan study that precedes one or more feasibility studies addressing specific buildings. For any these tasks, the committee may do this work on its own or with qualified municipal staff but more often it will hire a consultant (usually an architect experienced in school design) to do these preliminary planning tasks.

The Role of the Architect in Preliminary Project Planning

Although the most commonly recognized task of the architect on a school building project is the design of the building, the architect's role typically starts much earlier and continues well beyond the design phases. Communities usually expect the architect to guide the school planning process from the earliest stage of project definition through design, construction and final occupancy of the building.

At the earliest project stages, the architect can research and analyze information necessary to address the questions asked above. The product of this effort would include some or all of the following:

Analysis of demographics and definition of projected enrollments.

Analysis of educational program needs and preparation of an educational space program (known as the educational specification).

Analysis of existing building(s) for condition, educational re-use potential and expansion possibilities.

Definition of site requirements and evaluation of prospective sites for their suitability and limitations as sites for new construction.

Diagrammatic or conceptual building planning sufficient to define the approximate size, scope, site impact and cost impact of a school building (or multiple building options) to satisfy the defined needs.

Analysis of other factors affecting project feasibility, including project schedule, project phasing and interim occupancy issues, overall project budget, and municipal fiscal impact.

Evaluation of state funding considerations, including assessment of project eligibility, schedule impact of the application process, and fiscal impact of the grant award and payment process.

Determination of project schedule based on time requirements for design, funding approval, construction approvals and building construction.

The School Building Assistance Program

The School Building Assistance (SBA) program exists primarily to assist Masssachusetts municipalities with the cost of creating or improving educational space in schools and has been doing so reliably for 50 years. Although SBA regulations include funding provisions for projects in a number of categories (including Major Reconstruction and Emergency Reconstruction), the vast majority of funded projects are Capital Construction projects, which are projects that provide new educational space (through alteration, expansion or new construction) to meet needs created by enrollment growth, inequity or educational program requirements.

Capital Construction projects are ranked in three priority groupings (known as Priority 1, Priority 2 and Priority 3) according to the degree of space need and racial imbalance that exists. Although the priority ranking affects the placement of a project in the pool of applications for a specific year (and, in the case of Priority 1, the amount of funding, the application process, eligibility criteria and award and payment process are essentially the same regardless of priority ranking.

The basic eligibility criteria for SBA funding are fairly straightforward. To be eligible, a school construction project must correct a significant educational space deficiency, it must meet all of the specific educational space standards established in SBA regulations, and it must result in a building with a 50-year useful life meeting all current code requirements. For a project involving renovations, simply stated, the completed project must be "functionally equivalent" to a new school.

The amount of funding that SBA will contribute to a project is a fixed percentage between 50% and 90% that has been established for each municipality by the legislature and has remained constant for a number of years. The vast majority of cities and towns are entitled to grants of be-

tween 60% and 80% of the total project cost. The grant amount is calculated as the fixed percentage of the total capital and interest cost of the project and is reimbursed to the city or town as equal annual payments, usually over a 20-year period starting the year after formal award of the grant.

The SBA application process is slightly more complicated to describe and involves a number of steps. Final grant applications must include both full architectural construction documents (plans and specifications) and a number of supporting documents and certifications, chief among them being certified municipal authorizations for the full project cost (Town Meeting or City Council vote, together with a debt-exclusion vote if required) and an estimate of the total project cost, including construction costs, project "soft" costs and interest costs.

Final applications are due by June 1 in order to be placed on the state's Priority List for consideration by the Board of Education the following fiscal year (usually at the Board's July or August meeting). Prior to submission of the final grant application, a number of preliminary steps must occur, including the Department of Education (D.o.E.) Needs Conference, the D.o.E. site visit and site approval, and D.o.E. approval of educational specifications and preliminary plans.

In order to avoid short-circuiting necessary components of the planning process, it is strongly advised that the Needs Conference and site approval be initiated no later than eight months prior to the intended grant application submission date. Special circumstances (such as complex site approval requirements) frequently necessitate even longer lead times.

The Department of Education recognizes the importance of allowing sufficient time for planning and recently has modified its regulations to require that preliminary approvals occur at specified minimum intervals prior to the final grant application submission. Specifically, the Needs Conference is required to take place prior to January 1 and the educational specification and preliminary plan approval must be submitted prior to March 1 of the calendar year in which the grant application is submitted.

The number of school projects funded each year is dependent on the amount of money authorized by the legislature in the prior year for initial grant payments. For many years, the legislature would authorize the full

amount necessary to fund all projects submitted in that year, so that grants were awarded for all eligible submitted projects at the Board of Education meeting. In recent years, the number of annual grant submissions has exceeded the number of projects that could be funded by the legislature's first-year payment authorization, resulting in a growing waiting list.

As things currently stand, it is estimated that the average Priority 2 project will be awarded a grant by the Board of Education three to five years after submission. Fortunately, the grant-approvals process allows municipalities to proceed with construction in advance of the grant award, once the grant application has been submitted, without jeopardizing grant eligibility. In addition, the legislature has recently taken steps to soften the economic impact of starting construction in advance of the grant award by allowing municipalities to undertake short-term borrowing (Bond Anticipation Notes, which allow periodic payment of interest only without principal) for up to five years instead of the two years previously allowed.

The requirements of SBA funding affect the school planning process in a number of ways. For any school project for which SBA funding is being considered, it first needs to be determined whether the project is eligible for SBA funding or whether the cost and effort to make a project meet the requirements is justified by the amount of funding assistance. Assuming the decision is made to pursue SBA funding, a project schedule needs to be developed that meshes the timetable for SBA milestone activities with other project scheduling requirements, including the planning, design and construction schedule, schedule requirements for municipal funding approval, and the required occupancy dates.

Time Requirements of the Design Process

Once the process of preliminary planning and project definition is complete, it is time to move into project design. This is the point at which a major financial commitment has to be made because the total cost of design and related services (survey and site exploration, specialized engineering, etc.) is a significant expenditure in its own right. This is frequently the point at which a major funding authorization is sought, either for design

work only or for the entire project cost.

For most major projects, design occurs in three phases: Schematic Design, Design Development, and Construction Documents. A more complete description of what constitutes each of these phases can be found elsewhere (such as in AIA Document B-141, Form of Contract between Owner and Architect). What we will address here is how the design schedule and funding approvals process relate.

It is assumed that, by the start of design, a Building Committee has been formed. It may be that the previously formed study committee is re-appointed as a Building Committee, or a new Building Committee may be formed at this time. The Building Committee and the School Committee both have formal roles in the process.

It is also assumed that, by the start of Schematic Design, several preliminary approvals steps have been taken: the SBA Building Needs Conference should have been held and formal SBA site approval obtained. It is strongly recommended that these steps occur at least eight months prior to the intended submission of the SBA grant application.

Submission of the educational specification and preliminary plans for Massachusetts Department of Education approval usually occurs sometime during the Schematic Design process. It will normally be the case that a preliminary educational specification will have been developed during the preliminary planning process. However, it is also usually true that the educational specification will undergo refinement as schematic plans are developed. Both the educational specification and the preliminary plans require a School Committee vote of approval prior to submission to the D.o.E. for approval.

The final grant application submission is made after the completion of the Design Development phase, usually at or close to the end of the Construction Documents phase. In addition to design plans and specifications and the certifications mentioned previously, several reviews and certifications are required from state and municipal agencies (including local public safety officials, the Massachusetts Historic Commission, the Architectural Access Board, the local conservation commission and, occasionally for larger projects, a Massachusetts Environmental Protection Agency Environmental Notification Form submission and review) that will require agency review

of developed plans. As a result, it is inadvisable to attempt to compress the design phases into less than an eight-month period.

Massachusetts Law—how it affects design and construction

Designer selection and the bidding and construction processes are regulated under what is known as the Omnibus Construction Reform Act and subsequent laws. The detailed requirements can be obtained from the manual entitled Designing and Constructing Municipal Facilities, often referred to simply as "the Inspector General's manual" [available from the BSA as publication #10]. In this brochure, we mention only those aspects that have major impacts on the project process.

Public designer selection involves a process of advertising, receiving written qualifications, and selection based on qualifications, usually through a process of review of qualifications, reference checks and interviews. This process usually requires a minimum of six to eight weeks. State regulations mandate a process that is qualifications-based rather than comparative fee-based, and state law is interpreted to prohibit solicitation of competitive fee proposals.

It will be necessary to go through designer selection at least once on any major project. If the architect is engaged during the study phase, it is possible to continue the services of that architect through the design and construction phases. This has the advantage of avoiding repetition of the designer-selection process, gives the project the advantages of continuity in the design process and knowledge base, and allows the municipality to build on what should be a well-established relationship of trust. Under statute, continuing the services of the architect who did the feasibility study requires the municipality to commission an independent professional review to confirm the appropriateness of the study process and results.

The impact of state law on the bidding and award process is somewhat more involved and you should refer to the Inspector General's manual mentioned above for a more complete understanding. In general, school construction projects are bid as single lump-sum general contracts. The process is complicated by the fact that statute also requires that a number of building trades (there is a list of 17 in the statute) be separately bid as "filed sub-bids" and that the general contract bidders incorporate the results of the filed sub-bidding into their lump-sum general bids.

There are three major implications of this. First, it requires that construction documents be very carefully crafted to define what work is the domain of the specific building trades and precisely delineate the limits of responsibility of the different trades. Second, it adds significantly to the time that must be allowed for the bidding and award process. Third, it substantially increases the prospect that there will be bid protests or other procedural disputes that may delay the awarding of a contract.

The process of advertising and receiving filed sub-bids and general contract bids can take four to six weeks. When sufficient time is allowed for review of bid results and qualifications and a reasonable period is allowed for resolution of bidding disputes, it becomes prudent to allow at least three months for the bidding and award process.

Construction—how to complete it successfully

A major consequence of the state-mandated bidding process is that it limits the owner's discretion in choosing a contractor and can foster an adversarial relation between owner and contractor, providing strong incentive to the contractor to seek out and exploit weaknesses in the contract documents. In this context, it is understandable that many municipalities are apprehensive about the potential for problems to occur that may affect the cost, schedule and quality of their school project.

Successful management of the construction process in the public sector is primarily dependent on three things:

a carefully crafted set of construction documents that precisely delineates the scope and requirements of the general contractor's work;

a project plan that identifies responsibilities and work requirements necessary to the project, including both general contract work and work that is not typically part of the General Contractor's work (examples include asbestos abatement and provision of furnishings & equipment); and

careful exercise of construction control procedures during the construction process.

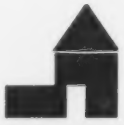
Construction control is a phrase used in the Massachusetts Building Code to describe a set of required procedures that help ensure the construction process produces the desired level of quality from the construction documents. Under the Building Code requirements, the architect is responsible for a coordinated set of project-monitoring procedures, including review and annotation of the contractor's detailed construction documentation (shop drawings and other submittals), administration of a construction testing program, special inspections, periodic site visits, and preparation of a project-completion report and a report of items still to be completed or corrected (the "punch list"). These procedures are mandated primarily to ensure the quality and conformance to design requirements of the finished building.

In the traditional contracts used for most public construction projects, the architect also has responsibility for procedures that enhance the owner's control over the cost and schedule of the project.

As part of the cost-control process, the architect reviews and approves the contractor's Schedule of Values, which is the tabulated valuation of building components against which payment is made. The architect is also responsible for reviewing and approving (or disapproving) the contractor's periodic requests for payment. In addition, the architect is responsible for reviewing all changes proposed during construction and negotiating the cost of changes with the contractor.

In the area of schedule control, the architect is responsible for reviewing the contractor's detailed project schedule for conformance to critical project dates established in the architectural contract documents. The architect is empowered to require remedial action by the contractor whenever the contractor's performance falls behind the approved schedule by a significant amount (typically 14 days). The architect also has the responsibility to determine the dates at which the project has reached substantial completion, which is a prerequisite for the building inspector's issuance of an occupancy permit.

While these processes are necessary to the success of a construction project, the key to a successful project is the establishment and maintenance of a strong working relationship and effective procedures for communication among all parties to construction, particularly between the owner and the owner's designers and management consultants. Construction moves quickly and the owner frequently must be prepared to make substantial



decisions on short notice in order to allow the project to proceed on schedule.

Owner's Representation and Project Management

So far we have talked only about the role of the general contractor, the building committee (as owner) and the architect. However, the broad range of responsibilities and tasks to be accomplished on a major building project requires the additional involvement of one or more other individuals or organizations. This may include the following:

Clerk of the Works: This is an individual, usually hired directly by the owner, who is on site full time during construction and acts as the owner's "eyes and ears" during construction. The clerk is responsible for observing and reporting on the progress of the work but does not have decision-making power on the project. Most major school projects will need a clerk of the works as a minimum level of owner's representation.

Owner's Representative: This may be an individual who performs the duties of the clerk of the works and also has delegated authority to speak and make decisions for the owner. This person may represent the owner at job-site meetings and be authorized, within specified limits, to authorize construction changes on behalf of the owner.

Project Manager for Construction: This may be either an individual or a company who provides an expanded range of services to the owner during construction. In addition to the duties of a clerk of the works or owner's representative, these services may include schedule monitoring, monitoring of project costs and budgets, and monitoring of project items outside of the general contract.

Program Manager (entire project): This may be either an individual or a company who provides an expanded range of services to the owner from the beginning of project planning through completion of construction. In addition to the duties of a construction project manager, these services can include monitoring of the pre-design and design process, establishing and monitoring overall project budgets, establishing and managing overall project schedules, coordination of regulatory reviews and approvals, management of non-construction components of the project, and coordination of independent consultants.

It should not be overlooked that the weight of a major school construction project can put tremendous demands on school department personnel and on members of a building committee, who are usually volunteers with full-time careers and other personal obligations. In addition to the clerk of the works, who should be viewed as a full-time requirement for any major project, it is frequently appropriate and necessary to engage someone to assist the building committee in its responsibilities, whether as an owner's representative or simply to assist with administrative matters for the owner, including the maintenance of project minutes, correspondence and project bookkeeping.

There are also occasions when it is clearly appropriate to involve a project management or program management firm. For a project of extraordinary size and complexity, or where the building committee is managing multiple projects with more than one architect, this approach should be seriously considered.

There are cautions to be observed, however, when considering the involvement of a project management or program management firm for a school construction project. The two major areas of concern are:

> to avoid contracting for services that duplicate services provided by the architect or others and
>
> to avoid introducing additional project participants in a way that obscures the obligations of or reduces the clarity of the roles of and communication among the owner, architect and contractor.

On the first of these points, it is important to remember that the architect has responsibility for quality control, submittal review and periodic project review in accordance with the construction-control provisions of the building code and is usually contractually responsible for cost-monitoring, schedule-monitoring, construction-change monitoring and certification of project completion.

Any services provided by a project manager or program manager in these areas must be tailored to supplement and not duplicate those services as provided by the architect. This is important not only to avoid the cost of duplicate services but because the SBAB will not provide reimbursement on project management services which, in its view, duplicate those provided by the architect.

On the second point, it needs to be re-emphasized that the key to a successful project is the establishment and maintenance of a strong working relationship and effective procedures for communication among all parties to construction, and most particularly among members of the owner's team. All else being equal, the fewer the participants, the better the chances for establishing effective communication among all participants.

With this in mind, the owner who is considering a project manager or program manager should ask him/herself what it is that the owner expects of this new "manager" that cannot be provided by the owner or the architect. The answer may be that the owner is concerned about maintaining control of the cost, the schedule, or the overall quality of the project.

In this context, the owner should recognize that there are many architects who specialize in public-sector construction and are extremely capable of handling these aspects of the work. The owner may be better served by emphasizing these issues in the designer-selection process and selecting an architect who has these capabilities. Similarly, if the primary concern is control of the construction process, the owner's best interest may lie in selecting the architect and the clerk of the works or owner's representative with regard to their demonstrated capabilities in this area.

There are other areas of concern that may lead an owner to consider engaging a project or program manager (PM). The owner may be concerned that there are aspects of the project, including furnishings and equipment, data and communications technology, overall project budgeting and perhaps issues relating to hazardous materials or site environmental concerns that will require expertise not normally provided by architects.

One response to this is to engage a PM to manage these aspects of the project. However, there are many architects who specialize in public school projects and who have developed the expertise to provide and coordinate these services. By selecting an architect with these capabilities, the owner may find advantage not only in having fewer participants in the process but also in the potential for better integration of

the varied project components due to single source design and management responsibility.

The other potential reason to consider a PM is the desire to have "a second set of eyes" on the project. The desire to get independent verification of crucial decisions and recommendations at key points in a major project is understandable and legitimate. In fact, statutes governing design have requirements for this at several points, including the requirement for independent peer review of architectural feasibility studies for public projects when an architect is providing continuing service and the Code requirement for peer review of structural design on all major projects.

An owner may reasonably have a desire for project oversight and outside review that goes beyond these requirements and extend to such topics as project cost, system selection or constructability. In these instances, the owner may be well-advised to seek out and engage individuals with the expertise to provide review services in the particular areas of concern.

Conclusion

In considering the myriad procedures and decisions involved in getting a school project from idea to reality, it is important to remember that a major part of the Building Committee's mission is to build a building that serves its function well and is a source of municipal pride. To achieve this within the confines established by time, budget and other resource limitations is a significant accomplishment.

In order to achieve this, it is necessary that members of the building committee and the building professionals it engages all share this mission, and that a relationship of respect and trust develop among committee members and its building professionals that is conducive to the open communication and honest deliberation that must be part of a successful planning and building project. Projects pursued in this spirit have by far the best prospect of yielding positive results for project participants and the community.

References for further reading:

Regulations Governing the School Building Assistance Act (June 1997—Publication 16991)

School Building Assistance Capital Grant Application

Designing and Constructing Municipal Facilities (available from the Boston Society of Architects; publication #10)

AIA Document B-141, the Owner—Architect Agreement (available from the Boston Society of Architects)

AIA Document A-201, the Owner—Contractor Agreement (available from the Boston Society of Architects)

SBA regulations and the grant application package are available from:

School Building Assistance Services
Massachusetts Department of Education
350 Main Street
Malden, MA 02148

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Related Boston Society of Architects' publications include the Client Advisor (a description of project-delivery alternatives such as design/build; publication #176) and three booklets on "What every owner needs to know about...FastTrack" [publication #153], " ...Value Engineering" [#154], and "...RFIs" [#155]. Call 617-951-1433 x221 for ordering information.

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